Claim Amendments:

This listing of claims, in which claims 1, 17, 18 and 25 are currently amended and claims 35-38 are newly added, replaces all prior versions, and listings, of claims in the application:

1. (Currently Amended) A pump for use with a flexible tube operably disposed therein for delivering liquid to a patient, the pump comprising:

a first tube-clamping member ~~adapted~~ having a range of motion to block the flexible tube;

a first set of tube squeezing members ~~adapted~~, each of the first set of tube squeezing member having a range of motion limited to constrict the flexible tube;

a second tube-clamping member ~~adapted~~ having a range of motion to block the flexible tube;

a second set of tube squeezing members ~~adapted~~, each of the second set of tube squeezing member having a range of motion limited to constrict the flexible tube, said first tube-clamping, first set of tube squeezing, second tube-clamping and second set of tube squeezing members being sequentially arranged in a direction from upstream to downstream;

a motor; and

a synchronizing device operably associated with said motor and said first tube-clamping, first set of tube squeezing, second tube-clamping and second set of tube squeezing members, said synchronizing device operable to activate said first tube-clamping, first set of tube squeezing, second tube-clamping and second set of tube squeezing members in a sequential order to engage the flexible tube such that liquid in the flexible tube is pumped in a downstream direction.

2. (Previously Presented) The pump of claim 1 wherein the flexible tube comprises a drip chamber, a valve, and at least one squeezing segment defining two ends, said tube-clamping and tube squeezing members being adapted to engage the at least one squeezing segment.

3. (Canceled)

4. (Previously Presented) The pump of claim 1 wherein each member of said first and second set of tube squeezing members comprises a pressing surface adapted to constrict the flexible tube.

5. (Previously Presented) The pump of claim 1 wherein the squeezing area defined by said first set of squeezing members is about twice that of the squeezing area defined by said second set of squeezing members.

6. (Previously Presented) The pump of claim 1 wherein said synchronizing device comprises an axle and a plurality of eccentric cams operably associated with the axle, each of the plurality of cams adapted to engage a respective member of said clamping or squeezing members.

7. (Previously Presented) The pump of claim 6 wherein said motor is operable to revolve said synchronizing device.

8. (Previously Presented) The pump of claim 1, further comprising an ultrasonic sensor operably associated with the flexible tube for detecting air therein.

9. (Previously Presented) The pump of claim 1, further comprising a communication device in communication with the motor and operable to deliver information and receive commands.

10. (Previously Presented) The pump of claim 2 wherein the flexible tube further comprises a drip sensor for sensing and counting the drips passing through said drip chamber.

11. (Previously Presented) The pump of claim 1, further comprising a sensor unit adapted for determining the pressure of a liquid flowing within said flexible tube.

12. (Previously Presented) The pump of claim 11 wherein the sensor unit defines a tube receiving space formed by walls engaging at least a portion of said flexible tube and comprises a sensing member projecting into the space for determining deformation-resistance of said flexible tube.

13. (Previously Presented) The pump of claim 12 wherein said sensing member comprises a plunger associated with a strain gage, said tube receiving space is defined by a rectangular shape and said plunger projects through one of the walls defining said tube receiving space.

14. (Previously Presented) The pump of claim 7, further comprising a controller for controlling said motor to achieve linear flow of liquid within the flexible tube, said controller using an algorithm for revolving said motor in a specific nonlinear revolution, the algorithm adapted to:

divide the motor revolution into a number of steps;

rotate said motor, sequentially from first step to the last step of each revolution, wherein each step or a group of steps has an individual speed and an individual pause time between steps or a group of steps;

measure the liquid flow, in the output of the pump, in each step and in each pause;

calculate or change the speed of each step and the duration of each pause, to achieve the desired flow function; and

store in a memory the flow function of the nonlinear revolution of said motor.

15. (Previously Presented) The pump of claim 14, wherein said algorithm is used sequentially during the operation of the pump.

16. (Previously Presented) The pump of claim 15 wherein said algorithm is used for calibration to obtain said flow function of nonlinear revolution and said controller uses the obtained function to revolve said motor in further operation of the pump.

17. (Currently Amended) A method for controlling a pump in which a flexible tube is disposed for delivery of a liquid, comprising:

activating a second tube-clamping member into blocking a lumen of the tube and a first tube-clamping member to open the lumen of the tube;

while the second tube-clamping member blocks the lumen, activating a second set of tube squeezing members to constrict a second portion of the tube and a first set of tube squeezing members to allow expansion of a first portion of the tube;

activating the first tube-clamping member into blocking the lumen of the tube;

while the first tube-clamping member blocks the lumen, activating the second clamping member to open the lumen of the tube, and the second set of tube squeezing members to allow expansion of the second portion of the tube; and

while the first tube-clamping member blocks the lumen and the second clamping member is not blocking the lumen and the second set of tube squeezing member are not constricting the lumen, activating the first set of tube squeezing members to constrict the first portion of the tube

the first tube-clamping member being upstream from the first set of tube squeezing members, the first set of tube squeezing member being upstream from the second tube-clamping member, the second tube-clamping member being upstream from the second set of tube squeezing members.

18. (Currently Amended) An injection apparatus comprising, in combination, a pump for pumping liquid through a flexible tube;

wherein the pump comprises:

a motor;

a first tube-clamping member ~~adapted~~ having a range of motion to block the flexible tube;

a first set of tube squeezing members ~~adapted~~, each of the first set of tube squeezing member having a range of motion limited to constrict the flexible tube;

a second tube-clamping member ~~adapted~~ having a range of motion to block the flexible tube;

a second set of tube squeezing members ~~adapted~~, each of the second set of tube squeezing member having a range of motion limited to constrict the flexible tube, said first tube-clamping, first set of tube squeezing, second tube-clamping and second set of tube squeezing members being sequentially arranged in a direction from upstream to downstream; and

a synchronizing device operably associated with said motor and said first tube-clamping, first set of tube squeezing, second tube-clamping and second set of tube squeezing members, said synchronizing device operable to activate said first tube-clamping, first set of tube squeezing, second tube-clamping and second set of tube squeezing members in a sequential order to engage the flexible tube such that fluid in the flexible tube is pumped in a downstream direction; and

wherein the flexible tube comprises at least one squeezing segment operable to be engaged by said first tube-clamping, first set of tube squeezing, second tube-clamping and second set of tube squeezing members to pump fluid within the flexible tube in a downstream direction.

19. (Previously Presented) The pump of claim 1 wherein said first set of tube squeezing members comprises four tube squeezing members and said second set of tube squeezing members comprises two tube squeezing members.

20. (Canceled)

21. (Previously Presented) The pump of claim 1 wherein each of said first and second tube-clamping members comprises a blade surface adapted to block the flexible tube.

22. (Previously Presented) The injection apparatus of claim 18 wherein the squeezing area defined by said first set of squeezing members is about twice that of the squeezing area defined by said second set of squeezing members.

23. (Previously Presented) The injection apparatus of claim 18 wherein said synchronizing device comprises an axle and a plurality of eccentric cams operably associated with the axle, each of the plurality of cams adapted to engage a respective member of said clamping or squeezing members.

24. (Previously Presented) The injection apparatus of claim 18 wherein said first set of tube squeezing members comprises four tube squeezing members and said second set of tube squeezing members comprises two tube squeezing members.

25. (Canceled)

26. (Previously Presented) The injection apparatus of claim 18 wherein each of said first and second tube-clamping members comprises a blade surface adapted to block the flexible tube.

27. (Currently Amended) An injection apparatus comprising a pump and a flexible tube for use with the pump, wherein the pump comprises:

a first tube-clamping member ~~adapted~~ having a range of motion to block the flexible tube;

a first plurality of tube squeezing members ~~adapted~~, each of the second set of tube squeezing member having a range of motion limited to constrict the flexible tube;

a second tube-clamping member ~~adapted~~ having a range of motion to block the flexible tube; and

a second plurality of tube squeezing members ~~adapted~~, each of the second set of tube squeezing member having a range of motion limited to constrict the flexible tube, said first tube-clamping, first plurality of tube squeezing, second tube-clamping and second plurality of tube squeezing members being sequentially arranged in a direction from upstream to downstream; and

wherein the flexible tube comprises at least one squeezing segment operable to be engaged by said first tube-clamping, first plurality of tube squeezing, second tube-clamping and second plurality of tube squeezing members to pump fluid within the flexible tube in a downstream direction.

28. (Previously Presented) The injection apparatus of claim 27 wherein the pump further comprises a motor and a synchronizing device operably associated with said motor and said first tube-clamping, first plurality of tube squeezing, second tube-clamping and second plurality of tube squeezing members, said synchronizing device operable to activate said first tube-clamping, first plurality of tube squeezing, second tube-clamping and second plurality of tube squeezing members in a sequential order to engage the flexible tube such that fluid in the flexible tube is pumped in a downstream direction

29. (Previously Presented) The injection apparatus of claim 27 wherein the squeezing area defined by said first plurality of squeezing members is about twice that of the squeezing area defined by said second plurality of squeezing members.

30. (Previously Presented) The injection apparatus of claim 28 wherein said synchronizing device comprises an axle and a plurality of eccentric cams operably associated with the axle, each of the plurality of cams adapted to engage a respective member of said clamping or squeezing members.

31. (Previously Presented) The injection apparatus of claim 27 wherein said first plurality of tube squeezing members comprises four tube squeezing members and said second plurality of tube squeezing members comprises two tube squeezing members.

32. (Previously Presented) The injection apparatus of claim 27 wherein each member of said first and second plurality of tube squeezing members comprises a pressing surface adapted to constrict the flexible tube.

33. (Previously Presented) The injection apparatus of claim 27 wherein each of said first and second tube-clamping members comprises a blade surface adapted to block the flexible tube.

34. (Previously Presented) The pump of Claim 2 wherein each end of the at least one squeezing segment is associated with a stopper.

35. (New) A pump for use with a flexible tube operably disposed therein for delivering liquid to a patient, the pump comprising:

a first tube-clamping member adapted to block the flexible tube;

a first set of tube squeezing members adapted to constrict the flexible tube;

a second tube-clamping member adapted to block the flexible tube;

a second set of tube squeezing members adapted to constrict the flexible tube, said first tube-clamping, first set of tube squeezing, second tube-clamping and second set of tube squeezing members being sequentially arranged in a direction from upstream to downstream;

a motor; and

a synchronizing device operably associated with said motor and said first tube-clamping, first set of tube squeezing, second tube-clamping and second set of tube

squeezing members, said synchronizing device operable to activate said first tube-clamping, first set of tube squeezing, second tube-clamping and second set of tube squeezing members in a sequential order to engage the flexible tube such that liquid in the flexible tube is pumped in a downstream direction; and

a sensor unit adapted for determining the pressure of a liquid flowing within said flexible tube, the sensor unit defining a tube receiving space formed by walls engaging at least a portion of said flexible tube, the sensor comprising a sensing member projecting into the space for determining deformation-resistance of said flexible tub and a plunger associated with a strain gage, said tube receiving space being defined by a rectangular shape and said plunger projecting through one of the walls defining said tube receiving space.

36. (New) A pump for use with a flexible tube operably disposed therein for delivering liquid to a patient, the pump comprising:

a first tube-clamping member adapted having a range of motion to block the flexible tube;

a first set of tube squeezing members adapted, each of the first set of tube squeezing member having a range of motion limited to constrict the flexible tube;

a second tube-clamping member adapted having a range of motion to block the flexible tube;

a second set of tube squeezing members adapted, each of the second set of tube squeezing member having a range of motion limited to constrict the flexible tube, said first tube-clamping, first set of tube squeezing, second tube-clamping and second set of tube

squeezing members being sequentially arranged in a direction from upstream to downstream;

a motor;

a synchronizing device operably associated with said motor and said first tube-clamping, first set of tube squeezing, second tube-clamping and second set of tube squeezing members, said synchronizing device operable to activate said first tube-clamping, first set of tube squeezing, second tube-clamping and second set of tube squeezing members in a sequential order to engage the flexible tube such that liquid in the flexible tube is pumped in a downstream direction, said synchronizing device comprises an axle and a plurality of eccentric cams operably associated with the axle, each of the plurality of cams adapted to engage a respective member of said clamping or squeezing members, said motor being operable to revolve said synchronizing device; and

a controller for controlling said motor to achieve linear flow of liquid within the flexible tube, said controller using an algorithm for revolving said motor in a specific nonlinear revolution, the algorithm adapted to:

divide the motor revolution into a number of steps;

rotate said motor, sequentially from first step to the last step of each revolution, wherein each step or a group of steps has an individual speed and an individual pause time between steps or a group of steps;

measure the liquid flow, in the output of the pump, in each step and in each pause;

calculate or change the speed of each step and the duration of each pause, to achieve the desired flow function; and

store in a memory the flow function of the nonlinear revolution of said motor.

37. (New) The pump of claim 36 wherein said algorithm is used sequentially during the operation of the pump.

38. (New) The pump of claim 37 wherein said algorithm is used for calibration to obtain said flow function of nonlinear revolution and said controller uses the obtained function to revolve said motor in further operation of the pump.